Research Article

Effect of Camera Angle on Perception of Trust and Attractiveness

Empirical Studies of the Arts
0(0) 1–11

DOI: 10.1177/0276237417710762
journals.sagepub.com/home/art
SAGE

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Abstract

Film theories have long proposed that the vertical camera angle influences how the scene and the character in it are interpreted. An elevated camera (high-angle shot) should diminish the qualities of the actor, whereas a lowered camera (low-angle shot) should elevate the actor in perspective as well as in the viewer's opinion. We were interested in how this holds up for the impression of trustworthiness and attractiveness that the spectator receives of the actor. We filmed 12 actors in a scenario inspired by a TV show called *Split or Steal*, which features a one-time version of the prisoner's dilemma. Subjects had to rate trustworthiness and attractiveness of the actors, and also judge if the actors would lie or tell the truth. We found that actors were rated as most trustworthy when filmed from eye-level, and less so when the camera was lowered or raised. Camera elevation had no effect on attractiveness. Also, personality ratings of the actors were not altered by varying camera angle. We conclude that context plays an important role in how camera angle interacts with actor perception.

Keywords

camera angle, trust, attractiveness, camera semantics, movie

Introduction

Television and film use conventions which are referred to as the "grammar" of the audiovisual medium. These conventions suggest that editing techniques and

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camera angle convey meaning and thus modify the interpretation of a given scene (Chandler, 2001). Convention has it that a low-angle shot, where the camera is placed below a person's eye-point, should make the actor appear larger and more powerful. This perspective emphasizes the dominance of the actor. In contrast, a high-angle shot, where the camera is positioned above the eye-level of the actors, looking down, is taken to diminish the actor's status and establishes impotence and vulnerability. For neutral scenes and factual programs, the shot from eye-level is recommended. It leads to a natural perspective perception, with observer and subject being on the same level (for detailed discussions and film conventions, see Boorstin, 1991; Bordwell & Thompson, 2010; Eisenstein, 1949; Münsterberg, 1970).

Elevation of the camera angle can vary greatly from barely noticeable to bird's-eye or worm's-eye view. Giannetti (1972) argues that the variation of camera angle in the same situation conveys changes in perception that are mostly quantitative. A slight elevation may produce subtle emotional changes while strong deviations from eye-level might have a dominating influence on the atmosphere of the scene. The more extreme the camera angle, the more likely it is to reinforce or alter the narrative structure. By varying the angle, the director conveys meaning. A person filmed from above suggests a meaning that can be opposite to that conveyed when the same person is filmed from below, everything else being equal.

Despite these conventions found in basic textbooks and theoretical literature on film, comparatively few empirical studies have been conducted to evaluate the effect of vertical camera angle on perception. Most of the existing studies have focused on source credibility of television speakers (Avery & Long, 1976; McCain, Chilberg, & Wakshlag, 1977; McCain & Wakshlag, 1974; Tiemens, 1970) or have measured Osgood's semantic differential for evaluation, potency, and activation (Avery & Long, 1976; Mandell & Shaw, 1973; Meridian, 1987; Sevenants & d'Ydewalle, 2006). They have found some evidence for an effect of camera angle on the viewer's perception. However, the findings are quite heterogeneous, which might be caused by the use of different content, different measure instruments and scales, and different camera angles (Figure 1).

Tiemens (1970), for example, found that one of the three newsreaders was rated higher on "communicative ability" and "knowledgeability" when filmed from a lower vantage point compared with a high vantage point. However, none of the newsreaders was rated differently regarding their "authoritative" and "convincing" nature. Avery and Long (1976) also found only minor differences for varying camera angles. An elevated camera angle resulted in higher sociability ratings.

McCain et al. (1977) had expected the opposite effect, and ended up arguing that power and dominance concepts contained in the writings of film theorists are not similar enough to the multidimensional construct of source credibility to warrant comparable results. High power and dominance ratings of a television

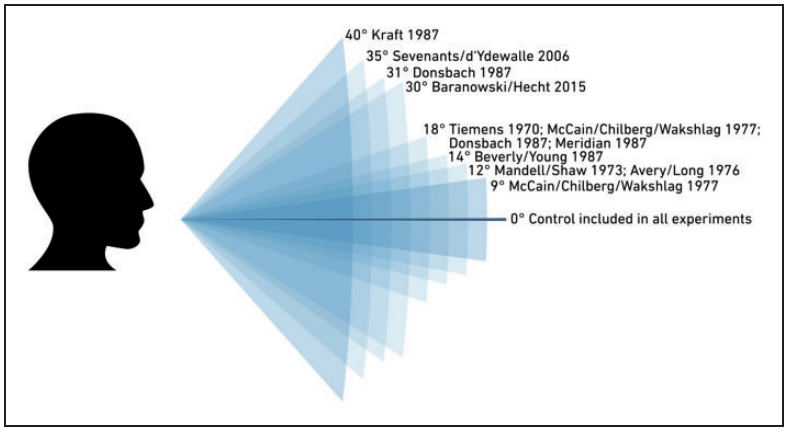

Figure 1. The vertical camera angles (elevation) that have been used in previous studies. All studies have used the same positive and negative camera angles. Note that McCain and Wakshlag (1974) did not provide a camera angle in their original report.

source should correlate negatively with credibility ratings. For three of the four dimensions of source credibility for a television speaker, McCain et al. (1977) found results accordingly. A higher camera angle led to a higher rating of competence, composure, and sociability. Only dynamism was not associated with camera angle. In the second part of the study, they used high- and low-angle shots in interaction with eye-level shots. In this dynamic scenario, they could show that source credibility was higher, when fewer non-eye-level shots were used.

Two studies have looked at the interaction of narrative and camera angle (Kraft, 1987; Sevenants & d'Ydewalle, 2006). Kraft (1987) showed participants six short-four-picture stories, for example, "The Encounter" (two dogs greet each other) or "The Dented Car" (a man and a woman are involved in a mild car accident). Camera angle was varied for both characters in the story. Kraft found that low angles produced an image of strength, action, and superiority; eye-level shots produced parity; and high angles created impressions of weakness, passivity, and insignificance. In a similar design, Sevenants and d'Ydewalle (2006) showed that a low-angle shot elicited significantly more potency (which was also found by Mandell & Shaw, 1973; but not by Meridian, 1987).

McCain and Wakshlag (1974) also looked at the effect of the camera angle on perceived interpersonal attractiveness. They presented eight taped auditions to their students, in which students applied for the position of newscaster at a campus newspaper. The tapes had varying camera angles and screen sizes. The authors concluded that low-angle shots may increase credibility and attraction, but only when used sparingly. The study emphasizes that shots are interdependent and camera angles are perceived in relation to one another. This was

replicated in a second study (McCain et al., 1977). To our knowledge, no other study has been conducted using moving images to address the relationship between camera angle and attractiveness. However, there have been many studies with photographs that tend to show that women are perceived to be more attractive when pictured from a high camera angle, whereas for men no such trend exists (e.g., Rudder, 2010; Schneider, Hecht, & Carbon, 2012).

In the present study, we were interested in looking at the effects of camera elevation on trustworthiness and attractiveness. Past studies have focused on the construct of source credibility of television speakers while we wanted to focus on interpersonal trust. Trustworthiness can be seen as a factor of source credibility, which includes other factors such as expertise, thus both constructs are correlated (Wiener & Mowen, 1986). We thus designed an experiment in which actors were speaking directly into the camera, as if they were speaking to the subject, and the subject alone. In line with McCain et al. (1977), we hypothesized that eye-level shots would elicit the most trust, compared with high- and low-angle camera shots. We also assessed interpersonal attractiveness. When using existing films, camera elevation is confounded with context and narrative. We sought to remove these confounds by recording one scene simultaneously with cameras positioned at different elevations. We also expected men who are pictured from below to be rated as more attractive, because those shots tend to produce a sense of power and strength, which should be an attractive trait for men according to evolutionary psychology (e.g., Buss & Schmitt, 1993).

Methods

Participants

Thirty-four psychology students (female = 17, male = 17) participated in the experiment on a voluntary basis. Age ranged from 20 to 37 ($M = 24.50$, $SD = 3.39$). All subjects had normal or corrected-to-normal vision.

Materials

Twelve actors (6 female, 6 male) were filmed separately for 15 s each. We produced frontal head and shoulder close-ups and recorded with identical camera settings, merely differing in elevation. The actors were instructed to perform an individual script consisting of two to three sentences spoken directly into the camera, as if they were speaking directly to the audience. Each script was similar but varied slightly from the others, to keep a certain level of authenticity. In the clip, the actors had to convey their trustworthiness to the viewer. The look was inspired by a TV show called *Split or Steal*, which features a one-time version of the prisoner's dilemma. Actors were filmed in front of a green-screen, which was filled with a TV show studio in postproduction. The camera was placed on a

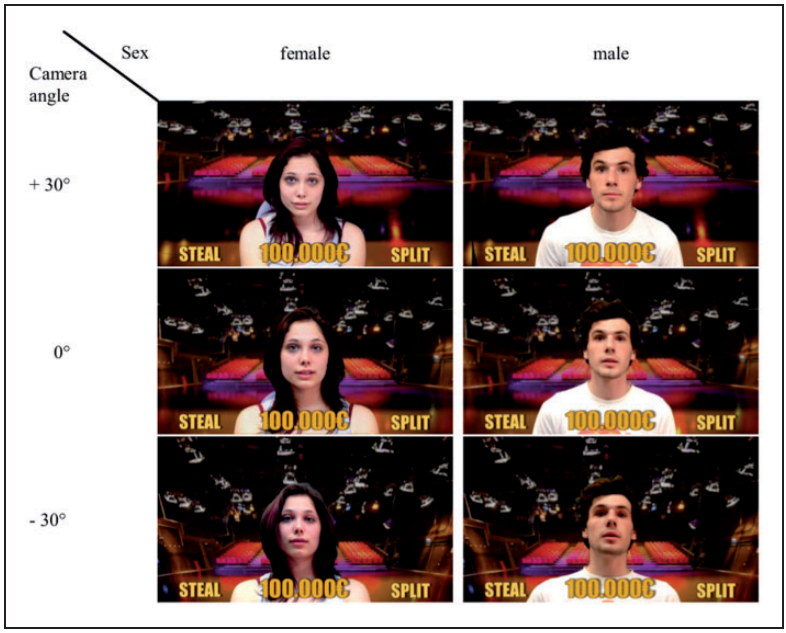

Figure 2. Screenshot of the stimulus used. Camera angle was varied vertically by 30° from the eye-level. The look of the scene was inspired by the TV show Split or Steal.

tripod 1 m away from the actors, and three different shots (low angle, eye-level, and high angle) of each character were taken (Figure 2). To ensure that the camera position did not vary in addition to its elevation, we opted to make three recordings rather than using three cameras mounted on a rack. The vertical angle for the low- and high-angle pictures was approximately 30° off eye-level, and we shot in 1080p. Each actor was instructed to maintain a fixed expression and use the exact same words during all three performances.

Questionnaire

The questionnaire consisted of four parts. Part one was composed of one dichotomous question, asking whether the person in the video decides to split (i.e., share the money) or steal (i.e., keep all the money). The question aimed to implicitly test trustworthiness. Part two asked "I found the person in the video . . ." followed by a scale from 1 to 10, 1 meaning *not attractive at all* and 10 *very attractive*. This was followed by five questions taken from the German translation of the Specific Interpersonal Trust Scale (Johnson-George & Swap, 1982). The questions we selected consisted of "I would expect the person in the film to play fair," "the person in the film would never intentionally misrepresent

my point of view to others,'' ''I could expect the person in the film to tell me the truth,'' I would be able to confide in the person in the film and know that he/she would want to listen,'' and ''If the person in the film knew what kinds of things hurt my feelings, I would never worry that he/she would use them against me, even if our relationship changed,'' on a scale from 1 to 9. The last section consisted of the short Big-Five-Inventory-10 (BFI-10; Rammstedt & John, 2007) to assess the personality of the actors. The BFI-10 consists of 10 questions, two for each personality trait (openness, conscientiousness, extraversion, agreeableness, and neuroticism) on scales from 0 to 4. We replaced ''I'' in the BFI-10 with ''the person in the film.''

Procedure

Each subject was tested individually. Upon arrival in the laboratory, subjects were seated 30 cm (horizontal viewing angle 45°) from the screen (72 cm × 42 cm). The seat was individually adjusted, so that subject's eye-level was at middle of the screen. The room was darkened and sound was provided via headphones. After signing a consent form, subjects received a written instruction for the experiment. They were told that they should imagine participating in the game show called Split or Steal. The concept resembled that of the prisoner's dilemma. It was explained that the actors in the film clips had the chance to steal or to split the money. If both the actor and the subject decide to split, each will get half the money. If only one decides to split and the other decides to steal, the uncooperative player receives all the money. If both participants decide to steal, they both walk away empty-handed. After each clip, the subjects had to decide whether the character in the film was trustworthy.

For each of the six conditions (3 camera elevations × 2 sexes), the subject saw two movie clips, amounting to a total of 12 clips. The average rating for the two films per condition was then used for further analysis. The film clips were shown in random order and subjects filled in a questionnaire after each presentation. The whole experiment lasted about half an hour. After they finished, subjects were thanked for their participation and fully debriefed.

Results

We conducted a 3 × 2 (Camera Angle: low, eye-level, high × Sex: female, male) two-way repeated measures multivariate analysis of variance with the dependent variables trust, attractiveness, and the Big-Five personality traits. This means that we were able to detect large effects of $\eta_p^2 = .14$ and larger (Faul, Erdfelder, Lang, & Buchner, 2007). Using Pillai's trace, we found main effects for camera angle, $F(14, 70) = 1.79$, $p = .048$, $\eta_p^2 = .25$, and sex, $F(7,14) = 4.15$, $p < .011$, $\eta_p^2 = .68$. The interaction between the two was not significant, $F(14, 70) = 0.89$, $p = .567$, $\eta_p^2 = .15$. A univariate test of camera angle, using the

Greenhouse–Geisser correction, indicated a significant effect on trust, $F(1.76, 27.14) = 5.80$, $p = .015$, $\eta_p^2 = .23$, but not on attractiveness, $F(1.96, 39.19) = 1.39$, $p = .261$, $\eta_p^2 = .07$. The camera at eye-level was associated with higher trust ratings. There was no effect of camera angle on personality traits, except for a nonsignificant trend on conscientiousness, $F(1.76, 35.23) = 1.94$, $p = .164$, $\eta_p^2 = .09$. The same procedure for sex unveiled a main effect on attractiveness, $F(1, 20) = 5.89$, $p = .025$, $\eta_p^2 = .23$, but not on trust, $F(1, 20) = 1.40$, $p = .190$, $\eta_p^2 = .08$. We also found an effect for the personality traits agreeableness, $F(1, 20) = 2.22$, $p = .010$, $\eta_p^2 = .29$, conscientiousness, $F(1, 20) = 7.42$, $p < .001$, $\eta_p^2 = .42$, and neuroticism, $F(1, 20) = 4.76$, $p = .041$, $\eta_p^2 = .19$.

A contrast analysis revealed that actors were rated as more trustworthy when filmed from eye-level ($M = 5.03$, $SD = 1.45$) compared with a low ($M = 4.27$, $SD = 0.81$), $F(1,20) = 8.89$, $p = .007$, $\eta_p^2 = .31$, or high camera angle ($M = 4.57$, $SD = 1.19$), $F(1,20) = 3.36$, $p = .082$, $\eta_p^2 = .14$ (Figure 3). Elevated and lowered camera angle did not differ with respect to trust ratings. We further found that

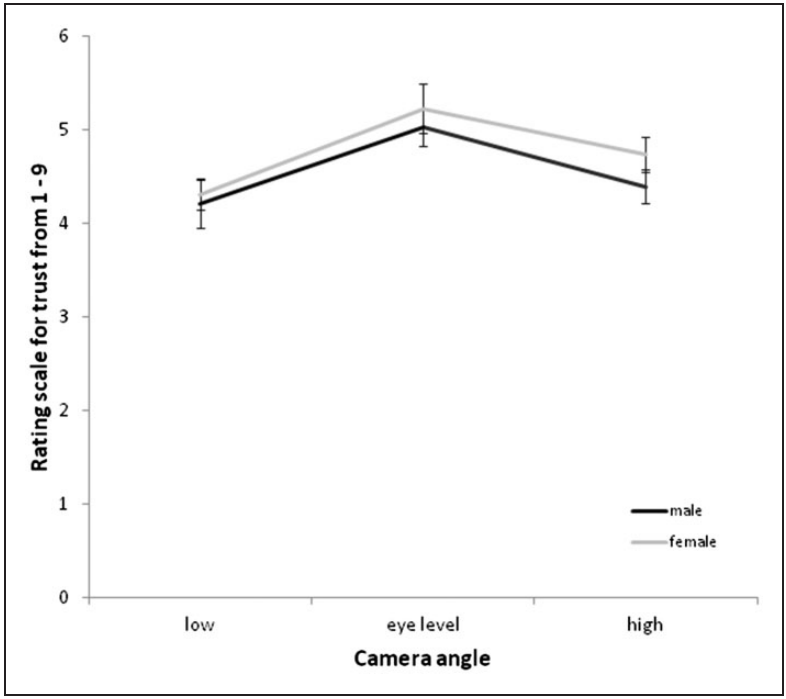

Figure 3. Ratings for trust by camera angle and sex. Actors filmed at eye-level were trusted most. No interaction between camera angle and sex of the actor was found. Error bars represent 1 *SEM*.
SEM: standard error of the mean.

the female actors were rated to be more attractive ($M = 5.79$, $SD = 1.50$) than male actors ($M = 5.06$, $SD = 1.38$), while men were rated as more agreeable ($M = 2.13$, $SD = 0.50$), conscientious ($M = 2.40$, $SD = 0.57$), and neurotic ($M = 2.00$, $SD = 0.67$) than women, $M = 1.88$, $SD = 0.67$; $M = 1.94$, $SD = 0.45$; and $M = 1.78$, $SD = 0.64$, respectively.

Discussion

In accordance with our hypothesis, we found that actors were rated as most trustworthy when filmed from eye-level. Low- and high-camera angles were equally associated with less trust. These results deviate from earlier findings obtained with still pictures or film scenes that were placed in a context of a news reporter reading the news or a longer narrative with a story arc. Also, given the short clip, the impression of trustworthiness obtained here may differ from the impression of credibility that can only be conveyed in the context of more elaborate narratives. We deliberately asked for personal trustworthiness within the tightly controlled setting of our self-generated film clips. It seems that when narrative-based context cues are removed and participants have to base personal decisions solely on one short clip, trustworthiness is highest when the camera maintains eye-level. Elevated or lowered camera directions reduced the actor's perceived trustworthiness. Note that compared with earlier studies, we have used rather large vertical camera angle differences of 30°. Thus, we cannot rule out that more subtle angle changes, for example, around 10° might have produced different results. However, when inspecting the stimuli (see Figure 2), we did not receive the impression that the 30° conditions looked particularly unnatural. It remains to be seen if our results can be replicated for smaller angle differences.

We tried to reduce narrative complexity in our study. In addition, we made the ratings more personal and therefore more relevant for the viewer by adding a prisoner's dilemma task. This should result in valid and reliable trustworthiness ratings. However, adding the prisoner's dilemma task also means it is challenging to compare the results of this study to previous studies that focused mainly on actor conceptualization.

We found that eye-level shots elicit the greatest amount of trust. The most likely explanation for this phenomenon is that participants perceive eye-level communication as the most even in terms of power distribution. Communicating to someone at eye-level implies that both agents are at the same level. Being talked down to likely was perceived as a form of asserting dominance from the actor. On the other hand, actors who were communicating from a lower vantage point might have been perceived as trying to lure in participants with a submissive but dishonest strategy.

We did not find an effect of camera angle on attractiveness of the actor. It could be that the camera angle differences that we have used were too small to

produce sufficient distortions of the facial proportions. Rudder (2010), for example, describes a camera angle of 70–80° to be attractive for women, and Schneider et al. (2012) have used 45°. We suspect, however, that attractiveness ratings are strongly context dependent and shots that might be favorable in one scene are disadvantageous in another scene. It is conceivable that camera angle changes in the range that we have used might affect attractiveness ratings in a romantic context.

Previous studies have shown a connection between attractiveness and trustworthiness (e.g., Wilson & Eckel, 2006). Attractive faces are generally judged as more trustworthy. However, it seems to be a causal relationship where attractiveness leads to more trust. The reverse is not true, subjects who are trusted are not automatically perceived as more attractive.

We further found that our female actors were generally rated as more attractive than our male actors. This is a pattern that tends to emerge when rating attractiveness of females and males. It seems that females are rated more favorable when taking a representative sample of the population in most conditions, which is reflected in many psychological studies (see, e.g., Baranowski & Hecht, 2015).

Male actors were rated as significantly more agreeable, conscientious, and neurotic than were female actors. One possible explanation is that while attractive people are associated with many positive traits, attractiveness correlates negatively with perception of integrity and concern for others (Eagly, Ashmore, Makhijani, & Longo, 1991). This translates to conscientiousness and at least some aspects of agreeableness.

In conclusion, our study showed that an eye-level camera angle is unsurpassed when attempting to elicit trust. This is useful when thinking of teleconferences and video-chats, where it might be important to transport trust. However, when taken together with previous findings, we argue that context plays an important role in how camera angle interacts with actor assessment. Further studies should systematically vary context and camera angles.

Acknowledgments

Special thanks go to Camillo Balzer, Maximilian Bexten, Jonas Groh, Malena Rassmann, Jan Rudloff, Irina Ruge, and Julius Welzel, for preparing the stimulus material and conducting the testing. Thanks to Wanja Hemmerich for the help in preparing the graphics.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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